MEDALLION LANDSCAPE
MANAGEMENT, INC.

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Tree Inventory and Construction Impacts to Trees at 256 and 292 Gibraltar Drive
Prepared by
Don Thomas, Medallion Landscape
Certified Arborist WE-1507
January 4, 2005

The following in a report on the trees at 256 and 292 Gibraltar Drive prepared by Medallion Landscape Management for General Development Incorporated (GDI). This report was prepared to complement and as a supplement to the previous report, *Report on Sidewalk Construction Impacts on Canary Island Pines at 256 and 292 Gibraltar Drive*, submitted by Medallion Landscape Management on December 14, 2004. The purpose of the previous report was to describe the effects of construction of a sidewalk on the health and stability of nearby Canary Island pines (Pinus canariensis).

This report was prepared to provide additional information on the trees at 256 and 292 Gibraltar Drive to meet the requirements of the City of Sunnyvale. This report contains the following:

1. An inventory of all trees on the site.

2. A map identifying and displaying the locations of all trees.

3. An estimation of the dollar value of each tree.

4. Recommendations on tree protection measures to be taken during sidewalk construction.

1850 South 7th Street, San Jose, CA 95112 • 500 Deerwood Rd., San Ramon, CA 94583
(408) 279-7090 FAX (408) 279-7098 1-800-440-MLMI
Cont. Lic. #C27-713234 PC Lic. #50084 Cert. Arborist WC-4439
www.mlmi.com

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TREE INVENTORY

An inventory of all of the trees on the site was conducted on December 20, 2004. All trees were identified to species, and the location was recorded on a site map. The diameter of each tree was also measured.

Table 1 presents the results of the tree inventory. In the table are presented the map identification number of the tree, the botanical name, the common name and the trunk diameter. (Trunk diameter was not measured, however, for trees less than 3 inches in circumference or about 1 inch in diameter). The following is the correspondence between the tree numbers assigned to the Canary Island pines in the previous report and the tree map numbers assigned in the present report:

Previous Report	Present Report
1	23
2	22
3	21
4	19
5	18
6	17
7	16
8	10
9	9
10	6
11	2

Included with this report is a map displaying the locations of all trees on the site, regardless of tree size. Each tree is identified by a number, which is the map identification number for the tree in Table 1. Figure 1 presents a general site plan for the Gibraltar Drive property showing tree locations. Figure 2 is a more detailed tree map for the site.

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TABLE 1

Tree No.	Botanical Name	Common Name	Diameter (Inches)
1	Lagerstroemia 'Muskogee'	Crape myrtle	1.8
2	Pinus canariensis	Canary Island pine	19.7
3	Sequoia 'Aptos Blue'	Coast redwood	3.0
4	Sequoia 'Aptos Blue'	Coast redwood	2.9
5	Sequoia 'Aptos Blue'	Coast redwood	2.5
6	Pinus canariensis	Canary Island pine	21.0
7	Sequoia 'Aptos Blue'	Coast redwood	3.2
8	Sequoia 'Aptos Blue'	Coast redwood	3.5
9	Pinus canariensis	Canary Island pine	8.3
10	Pinus canariensis	Canary Island pine	19.1
11	Sequoia 'Aptos Blue'	Coast redwood	3.0
12	Lagerstroemia 'Muskogee'	Crape myrtle	1.4
13	Lagerstroemia 'Muskogee'	Crape myrtle	1.6
14	Sequoia 'Aptos Blue'	Coast redwood	4.1
15	Sequoia 'Aptos Blue'	Coast redwood	4.8
16	Pinus canariensis	Canary Island pine	23.6
17	Pinus canariensis	Canary Island pine	22.3
18	Pinus canariensis	Canary Island pine	24.5
19	Pinus canariensis	Canary Island pine	21.0
20	Sequoia 'Aptos Blue'	Coast redwood	2.7
21	Pinus canariensis	Canary Island pine	29.9
22	Pinus canariensis	Canary Island pine	22.9
23	Pinus canariensis	Canary Island pine	22.3
24	Lagerstroemia 'Muskogee'	Crape myrtle	1.4
25	Platanus 'Yarwood'	London plane	1.1
26	Pinus halepensis	Aleppo pine	23.6
27	Ulmus parvifolia	Chinese elm	18.2
28	Ulmus parvifolia	Chinese elm	14.6
29	Ulmus parvifolia	Chinese elm	16.6
30	Ulmus parvifolia	Chinese elm	17.8
31	Ulmus parvifolia	Chinese elm	16.9
32	Prunus cerasifera	Flowering plum	3.8
33	Pyrus kawakamii	Evergreen pear	12.7
34	Pyrus kawakamii	Evergreen pear	8.3
35	Pyrus kawakamii	Evergreen pear	10.8
36	Sequoia sempervirens	Coast redwood	23.6
37	Sequoia sempervirens	Coast redwood	18.2
38	Sequoia sempervirens	Coast redwood	11.1
39	Sequoia sempervirens	Coast redwood	21.0
40	Sequoia sempervirens	Coast redwood	19.1
41	Sequoia sempervirens	Coast redwood	29.9
42	Pyrus kawakamii	Evergreen pear	9.9
43	Pyrus kawakamii	Evergreen pear	8.9
44	Pyrus kawakamii	Evergreen pear	8.6
45	Eucalyptus sideroxylon	Red ironbark	19.1
46	Eucalyptus sideroxylon	Red ironbark	18.8
47	Eucalyptus sideroxylon	Red ironbark	16.2
48	Eucalyptus sideroxylon	Red ironbark	26.8
49	Eucalyptus sideroxylon	Red ironbark	28.0
50	Eucalyptus sideroxylon	Red ironbark	21.7
51	Eucalyptus sideroxylon	Red ironbark	25.5
52	Eucalyptus sideroxylon	Red ironbark	19.7
53	Eucalyptus sideroxylon	Red ironbark	29.9
54	Platanus 'Yarwood'	London plane	1.1
55	Platanus 'Yarwood'	London plane	1.0
56	Quercus agrifolia	Coast live oak	16.2

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TABLE 1

Tree No.	Botanical Name	Common Name	Diameter (Inches)
57	Quercus agrifolia	Coast live oak	7.6
58	Eriobotrya x 'Coppertone'	India hawthorn	
59	Eriobotrya x 'Coppertone'	India hawthorn	
60	Eriobotrya x 'Coppertone'	India hawthorn	
61	Eriobotrya x 'Coppertone'	India hawthorn	
62	Lagerstroemia 'Muskogee'	Crape myrtle	1.3
63	Eriobotrya x 'Coppertone'	India hawthorn	
64	Eriobotrya x 'Coppertone'	India hawthorn	
65	Eriobotrya x 'Coppertone'	India hawthorn	
66	Eriobotrya x 'Coppertone'	India hawthorn	
67	Acer palmatum 'Bloodgood'	Japanese maple	
68	Eriobotrya x 'Coppertone'	India hawthorn	
69	Eriobotrya x 'Coppertone'	India hawthorn	
70	Eriobotrya x 'Coppertone'	India hawthorn	
71	Eriobotrya x 'Coppertone'	India hawthorn	
72	Eriobotrya x 'Coppertone'	India hawthorn	
73	Eriobotrya x 'Coppertone'	India hawthorn	
74	Eriobotrya x 'Coppertone'	India hawthorn	
75	Eriobotrya x 'Coppertone'	India hawthorn	
76	Lagerstroemia 'Muskogee'	Crape myrtle	1.8
77	Lagerstroemia 'Muskogee'	Crape myrtle	1.8
78	Lagerstroemia 'Muskogee'	Crape myrtle	1.6
79	Lagerstroemia 'Muskogee'	Crape myrtle	1.3
80	Lagerstroemia 'Muskogee'	Crape myrtle	1.6
81	Lagerstroemia 'Muskogee'	Crape myrtle	1.3
82	Eriobotrya x 'Coppertone'	India hawthorn	
83	Eriobotrya x 'Coppertone'	India hawthorn	
84	Eriobotrya x 'Coppertone'	India hawthorn	
85	Eriobotrya x 'Coppertone'	India hawthorn	
86	Prunus serrulata	Flowering cherry	14.6
87	Acer palmatum 'Bloodgood'	Japanese maple	
88	Eriobotrya x 'Coppertone'	India hawthorn	
89	Eriobotrya x 'Coppertone'	India hawthorn	
90	Eriobotrya x 'Coppertone'	India hawthorn	
91	Eriobotrya x 'Coppertone'	India hawthorn	
92	Eriobotrya x 'Coppertone'	India hawthorn	
93	Prunus serrulata	Flowering cherry	15.6
94	Eriobotrya x 'Coppertone'	India hawthorn	
95	Eriobotrya x 'Coppertone'	India hawthorn	
96	Eriobotrya x 'Coppertone'	India hawthorn	
97	Eriobotrya x 'Coppertone'	India hawthorn	
98	Prunus serrulata	Flowering cherry	4.8
99	Prunus serrulata	Flowering cherry	4.5
100	Prunus serrulata	Flowering cherry	5.1
101	Prunus serrulata	Flowering cherry	4.8
102	Prunus serrulata	Flowering cherry	5.1
103	Prunus serrulata	Flowering cherry	5.6
104	Prunus serrulata	Flowering cherry	4.5
105	Prunus serrulata	Flowering cherry	4.8
106	Prunus serrulata	Flowering cherry	10.2
107	Prunus serrulata	Flowering cherry	11.8
108	Acer palmatum 'Bloodgood'	Japanese maple	

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Figure 1. Site plan for 256 and 292 Gibraltar Drive displaying tree locations and tree identification numbers.

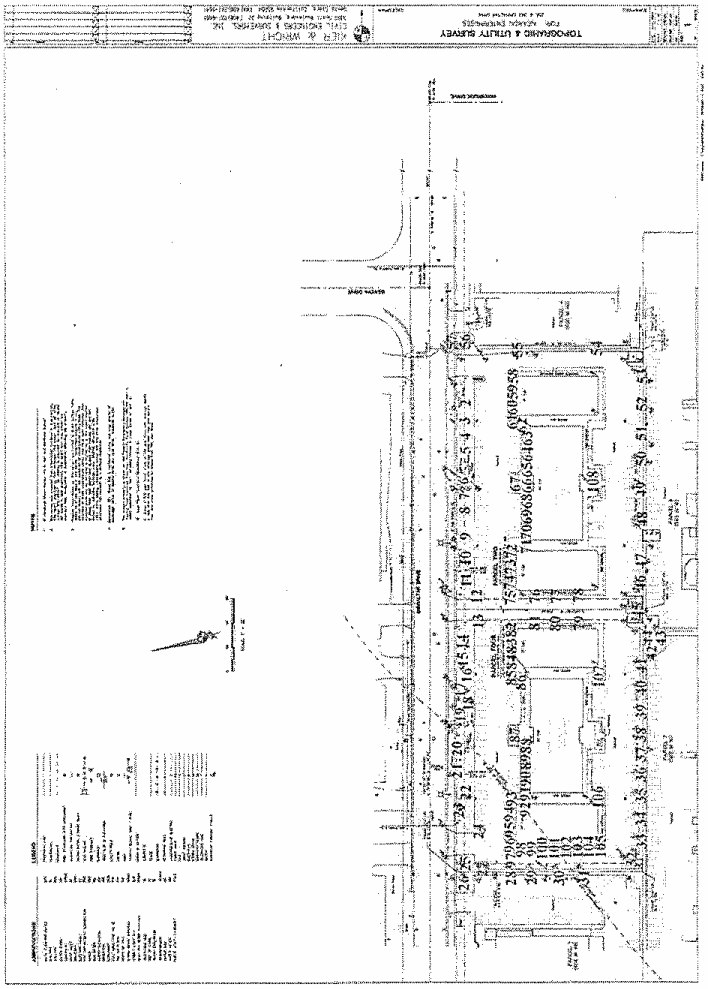

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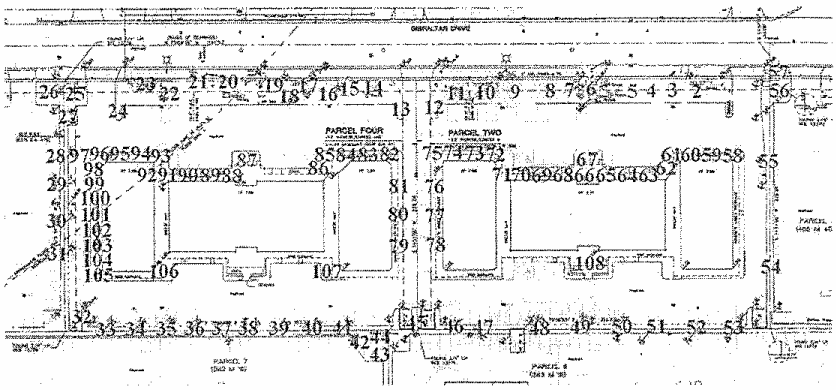
Figure 2. Trees at 256 and 292 Gibraltar Drive, identified by tree number. (See Table 1.)



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TREE APPRAISAL

Tree dollar values were established according to a simplified version of the method developed by the Council of Tree and Landscape Appraisers (CTLA). With this method, values are determined based upon the species of tree, its size, its condition and its location

In general, tree value is proportional to tree size (the larger the tree, the greater its value). Large trees are more valuable than smaller trees of the same type, reflecting the investment of time and resources needed to grow a larger tree in the nursery.

However, the species of the tree affects tree value because the value of the tree depends not only on its size but its inherent growth rate. Slow-growing small trees may be as valuable as, or more valuable than, larger faster-growing trees. For example, slow-growing trees, such as Japanese maple, are more valuable than faster growing trees, such as poplar or eucalyptus, of comparable size. The species of tree also affects tree value because some trees have aesthetically more desirable attributes such as attractive tree form, foliage, flowers, fruit or bark.

Tree condition affects value because a tree in poor condition may have little aesthetic value. In fact, a tree with poor structure may represent a liability because of tree hazards and, therefore, have low, or even negative, asset value.

The value of a tree also depends upon the tree's location and the contribution it makes to the value of a property. Trees in rural or wildland settings may have little value beyond their lumber, firewood or wildlife value. In contrast, trees in high-visibility landscapes on commercial and residential sites may represent up to 20 per cent of the total value of the property.

In the CTLA method of tree appraisal, tree value is estimated in two basic ways. For small trees, the value is the replacement cost of replanting with a nursery of the same size and type (the cost of the nursery plant plus the cost of installing it in the landscape).

For large trees, however, there are no replacement trees of comparable size available from the nursery. For these cases, the CTLA has developed a formula for calculating the value of a tree based upon tree trunk cross-sectional area. This formula is

Tree Value = Basic Tree Value X Species Rating X Condition Rating X Location Rating

Basic tree value is based upon trunk cross-sectional area multiplied by a dollar value for square inch of area. In this study the value of $48 per square inch of cross-sectional area was used.

The species rating is a factor with a value between zero and 1 that the basic tree value is modified by to adjust for tree species. Similarly, the condition and location ratings are

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also factors with a value between zero and 1 that are multiplied by the basic tree value to adjust it according to tree condition and location, respectively.

Table 2 presents values of appraised tree dollar value. For small trees, this value was determined from the installed cost of a nursery tree of comparable size. For larger trees, the value was calculated by the trunk size formula method. For these trees, the assumed values for species rating, condition rating and location rating are also presented. For most of the trees, the location rating value and the condition rating value for the trees was assumed to be 80 per cent. However, a value of 40 per cent for condition rating was assigned to Chinese elms because of a chronic problem with anthracnose disease. A lower rating was also given to red iron bark eucalyptus because of their brittle branches, which are subject to breakage.

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TABLE 2

Tree No.	Botanical Name	Cross-sectional Area (sq. inches)	Base value	Species Rating	Condition Rating	Location Rating	Dollar Value (Trunk Formula)	Dollar Value (Replacement Cost)
1	Lagerstroemia 'Muskogee'			0.9	0.8	0.8		$120.86
2	Pinus canariensis	306.05	$14,690.45	0.7	0.8	0.8	$9,401.89	
3	Sequoia 'Aptos Blue'			0.8	0.8	0.8		$120.86
4	Sequoia 'Aptos Blue'			0.8	0.8	0.8		$120.86
5	Sequoia 'Aptos Blue'			0.8	0.8	0.8		$120.86
6	Pinus canariensis	346.82	$16,647.13	0.7	0.8	0.8	$10,654.17	
7	Sequoia 'Aptos Blue'			0.8	0.8	0.8		$120.86
8	Sequoia 'Aptos Blue'			0.8	0.8	0.8		$120.86
9	Pinus canariensis	53.82	$2,583.44	0.7	0.8	0.8	$1,653.40	
10	Pinus canariensis	286.62	$13,757.96	0.7	0.8	0.8	$8,805.10	
11	Sequoia 'Aptos Blue'			0.8	0.8	0.8		$120.86
12	Lagerstroemia 'Muskogee'			0.9	0.8	0.8		$120.86
13	Lagerstroemia 'Muskogee'			0.9	0.8	0.8		$120.86
14	Sequoia 'Aptos Blue'			0.8	0.8	0.8		$120.86
15	Sequoia 'Aptos Blue'			0.8	0.8	0.8		$120.86
16	Pinus canariensis	435.99	$20,927.39	0.7	0.8	0.8	$13,393.53	
17	Pinus canariensis	390.13	$18,726.11	0.7	0.8	0.8	$11,984.71	
18	Pinus canariensis	472.05	$22,658.60	0.7	0.8	0.8	$14,501.50	
19	Pinus canariensis	346.82	$16,647.13	0.7	0.8	0.8	$10,654.17	
20	Sequoia 'Aptos Blue'			0.8	0.8	0.8		$120.86
21	Pinus canariensis	703.50	$33,768.15	0.7	0.8	0.8	$21,611.62	
22	Pinus canariensis	412.74	$19,811.46	0.7	0.8	0.8	$12,679.34	
23	Pinus canariensis	390.13	$18,726.11	0.7	0.8	0.8	$11,984.71	
24	Lagerstroemia 'Muskogee'			0.9	0.8	0.8		$120.86
25	Platanus 'Yarwood'			0.7	0.8	0.8		$120.86
26	Pinus halepensis	435.99	$20,927.39	0.8	0.8	0.8	$13,393.53	
27	Ulmus parvifolia	258.68	$12,416.56	0.4	0.4	0.8	$3,973.30	
28	Ulmus parvifolia	168.47	$8,086.62	0.4	0.4	0.8	$2,587.72	
29	Ulmus parvifolia	215.29	$10,333.76	0.4	0.4	0.8	$3,306.80	
30	Ulmus parvifolia	249.68	$11,984.71	0.4	0.4	0.8	$3,835.11	
31	Ulmus parvifolia	223.65	$10,735.03	0.4	0.4	0.8	$3,435.21	
32	Prunus cerasifera	11.46	$550.32	0.6	0.4	0.8	$176.10	
33	Pyrus kawakamii	127.39	$6,114.65	0.4	0.8	0.8	$3,913.38	
34	Pyrus kawakamii	53.82	$2,583.44	0.4	0.8	0.8	$1,653.40	
35	Pyrus kawakamii	92.04	$4,417.83	0.4	0.8	0.8	$2,827.41	
36	Sequoia sempervirens	435.99	$20,927.39	0.8	0.8	0.8	$13,393.53	
37	Sequoia sempervirens	258.68	$12,416.56	0.8	0.8	0.8	$7,946.60	
38	Sequoia sempervirens	97.53	$4,681.53	0.8	0.8	0.8	$2,996.18	
39	Sequoia sempervirens	346.82	$16,647.13	0.8	0.8	0.8	$10,654.17	
40	Sequoia sempervirens	286.62	$13,757.96	0.8	0.8	0.8	$8,805.10	
41	Sequoia sempervirens	703.50	$33,768.15	0.8	0.8	0.8	$21,611.62	
42	Pyrus kawakamii	76.51	$3,672.61	0.4	0.8	0.8	$2,350.47	
43	Pyrus kawakamii	62.42	$2,996.18	0.4	0.8	0.8	$1,917.55	
44	Pyrus kawakamii	58.04	$2,785.99	0.4	0.8	0.8	$1,783.03	
45	Eucalyptus sideroxylon	286.62	$13,757.96	0.4	0.4	0.8	$4,402.55	
46	Eucalyptus sideroxylon	277.15	$13,303.18	0.4	0.4	0.8	$4,257.02	
47	Eucalyptus sideroxylon	207.09	$9,940.13	0.4	0.4	0.8	$3,180.84	
48	Eucalyptus sideroxylon	561.78	$26,965.61	0.4	0.4	0.8	$8,628.99	
49	Eucalyptus sideroxylon	616.56	$29,594.90	0.4	0.4	0.8	$9,470.37	
50	Eucalyptus sideroxylon	368.15	$17,671.34	0.4	0.4	0.8	$5,654.83	
51	Eucalyptus sideroxylon	509.55	$24,458.60	0.4	0.4	0.8	$7,826.75	
52	Eucalyptus sideroxylon	306.05	$14,690.45	0.4	0.4	0.8	$4,700.94	
53	Eucalyptus sideroxylon	703.50	$33,768.15	0.4	0.4	0.8	$10,805.81	
54	Platanus 'Yarwood'			0.7	0.8	0.8		$120.86

TABLE 2

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Tree No.	Botanical Name	Cross-sectional Area (sq. inches)	Base value	Species Rating	Condition Rating	Location Rating	Dollar Value (Trunk Formula)	Dollar Value (Replacement Cost)
55	Platanus 'Yarwood'			0.7	0.8	0.8		$120.86
56	Quercus agrifolia	207.09	$9,940.13	0.9	0.8	0.8	$6,361.68	
57	Quercus agrifolia	45.86	$2,201.27	0.9	0.8	0.8	$1,408.82	
58	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
59	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
60	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
61	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
62	Lagerstroemia 'Muskogee'			0.9	0.8	0.8		$120.86
63	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
64	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
65	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
66	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
67	Acer palmatum 'Bloodgood'			1	0.8	0.8		$219.70
68	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
69	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
70	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
71	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
72	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
73	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
74	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
75	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
76	Lagerstroemia 'Muskogee'			0.9	0.8	0.8		$120.86
77	Lagerstroemia 'Muskogee'			0.9	0.8	0.8		$120.86
78	Lagerstroemia 'Muskogee'			0.9	0.8	0.8		$120.86
79	Lagerstroemia 'Muskogee'			0.9	0.8	0.8		$120.86
80	Lagerstroemia 'Muskogee'			0.9	0.8	0.8		$120.86
81	Lagerstroemia 'Muskogee'			0.9	0.8	0.8		$120.86
82	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
83	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
84	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
85	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
86	Prunus serrulata	168.47	$8,086.62	0.9	0.8	0.8	$5,175.44	
87	Acer palmatum 'Bloodgood'			1	0.8	0.8		$219.70
88	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
89	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
90	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
91	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
92	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
93	Prunus serrulata	191.16	$9,175.80	0.9	0.8	0.8	$5,872.51	
94	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
95	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
96	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
97	Eriobotrya x 'Coppertone'			1	0.8	0.8		$120.86
98	Prunus serrulata	17.91	$859.87	0.9	0.8	0.8	$550.32	
99	Prunus serrulata	15.61	$749.04	0.9	0.8	0.8	$479.39	
100	Prunus serrulata	20.38	$978.34	0.9	0.8	0.8	$626.14	
101	Prunus serrulata	17.91	$859.87	0.9	0.8	0.8	$550.32	
102	Prunus serrulata	20.38	$978.34	0.9	0.8	0.8	$626.14	
103	Prunus serrulata	24.38	$1,170.38	0.9	0.8	0.8	$749.04	
104	Prunus serrulata	15.61	$749.04	0.9	0.8	0.8	$479.39	
105	Prunus serrulata	17.91	$859.87	0.9	0.8	0.8	$550.32	
106	Prunus serrulata	81.53	$3,913.38	0.9	0.8	0.8	$2,504.56	
107	Prunus serrulata	109.00	$5,231.85	0.9	0.8	0.8	$3,348.38	
108	Acer palmatum 'Bloodgood'			1	0.8	0.8		$219.70

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TREE PROTECTION MEASURES

Measures should be taken to prevent construction impacts to the Canary Island pines. Construction impacts may include the following:

1. Severing of roots
2. Soil compaction
3. Soil grade changes
4. Mechanical damage to the trunk
5. Damage to branches and foliage
6. Alteration to hydrological characteristics of the site, such as drainage patterns and the water table

To mitigate these impacts, a tree protection zone (TPZ) should be establish around each of the Canary Island pines to be protected. Ideally, this should be a circular zone extending outward from the trunk a radial distance of 0.5 foot per inch of trunk diameter, or about 4 times the circumference of the trunk. This would represent the following radial distances from the trunk:

Tree Map Number	TPZ Radial Distance from Trunk (ft.)
2	10
6	11
9	4
10	10
16	12
17	11
18	12
19	11
21	15
22	11
23	11

Though some of these distances may not be possible because of the proximity of the sidewalk, by adjusting the shape of the tree protection zone, the same amount of area (3.14 times the square of the radius) should be provided for each tree or group of trees.

For the tree protection zone to be effective, the following practices should be followed:

1. Avoid equipment damage to foliage, branches and the trunk within the tree protection zone. This includes heat and exhaust damage from motorized equipment.

2. Do not excavate within the tree protection zone, or, if excavation must intrude into the zone, dig by hand, working around roots and retaining as many as possible.

3. Do not cut roots greater than 1 inch in diameter.

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4. When cutting roots, make a clean cut with a sharp implement, such as a hand saw.

5. Backfill excavations with topsoil similar to the surrounding soil. Compact the soil with care so as not to damage roots; do not over-compact the soil.

6. Do not drive motor vehicles through the tree protection zone, and do not park vehicles or store heavy equipment within this zone to avoid soil compaction. Do not allow pedestrian traffic within the tree protection zone because this will also compact the soil. If this cannot be avoided, cushion the soil from compaction with a thick (6 inch) layer of coarse organic mulch and use plywood to disperse the weight.

7. Do not store soil, building materials or chemicals within the tree protection zone.

8. Do not change the soil grade within the tree protection zone by adding soil over or removing soil from the root zone. This is especially important in the area immediately around the root crown.

9. Do not alter soil drainage patterns around the tree protection zone. Do not permit standing water or soil waterlogging to occur within the tree protection zone.

To prevent intrusion into the tree protection zone, each of the Canary Island pines or, where their protection zones overlap, groups of pines should be protected with a sturdy fence, such as a chain link fence. This fence should be secured in place so that it cannot be moved or easily entered. A typical fence specification is to use a 5-6 foot high chain link fence mounted on 2-inch diameter galvanized posts spaced no more than 10 feet apart, which are driven 2 feet into the ground.

Trees should be inspected for health at least once during construction activities to evaluate the effectiveness of the tree protection measures. There should also be a post-construction evaluation of tree health to determine whether trees experienced stress during construction and whether measures, such as fertilization, pruning or chemical treatment, are required to relieve this stress.

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Report on Sidewalk Construction Impacts on Canary Island Pines
At 256 and 292 Gibraltar Drive
Prepared by
Don Thomas, Certified Arborist

The following is a report on the impact of the construction of a 5-foot clearance for a sidewalk at 256 and 292 Gibraltar Drive in Sunnyvale. This report is based upon field observations made on December 13, 2004.

The trees that would be affected by the construction of a sidewalk are Canary Island pines (Pinus canariensis) and coast redwoods (Sequoia sempervirens). The Canary Island pines are medium-size trees growing on a berm in turf composed of kikuyugrass and other turfgrasses. These trees all appeared to be healthy and growing vigorously, probably because of the supplemental water and nutrients they receive from the turf.

The redwood trees are also growing in the turf and appear to be in good health, though one was observed to have mower damage to the trunk. These trees are all small and appear to have been recently planted.

To determine the effect of the construction of the sidewalk on the Canary Island pines, soil was probed with a shovel near the trees about 5 feet from the curb to locate surface roots. This was not done, however, for the redwoods because it was assumed that their roots are still small enough that construction of the sidewalk would not have a significant effect on their health.

The accompanying site map shows the approximate locations of the Canary Island pines. The trees are identified by sequential numbers beginning with the western-most tree at 256 Gibraltar Drive. Trees 1 through 7 are in front of 256 Gibraltar Drive, and trees 8, 9, 10 and 11 are in front of 292 Gibraltar Drive.

Photograph 1 shows the trees designated as trees 1, 2 and 3 on the site map. It was found that one of the pines, tree 1, has one large root within 5 feet of the curb. This root is shown in Photograph 2. Severing of this root might cause stress to the tree because of reduced water and nutrient uptake.

Tree 3 has a number of large roots within 5 feet of the curb (Photograph 3), and the trunk is only about 6 feet from the curb. This tree would experience significant stress if roots were cut for the sidewalk. Not only would the supply of moisture and nutrients be reduced, but the structural stability of the tree might be compromised because some of the main anchoring roots would be severed. This tree might need to be removed. In addition to the hazard posed by loss of root stability, it also has co-dominant leaders (a

1850 South 7th Street, San Jose, CA 95112 • 500 Deerwood Rd., San Ramon, CA 94583
(408) 279-7090 FAX (408) 279-7098 1-800-440-MLMI
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double trunk), which increases its hazard potential because of the possibility that the two trunks might split apart in a storm.

Photograph 4 shows trees 4, 5, 6 and 7. Tree 5 was found to have a major root about 4 inches in diameter within 5 feet of the curb (shown in Photograph 5). Cutting of this root will result in significant root system loss and can be expected to result in stress. The other trees in this group were found to have only small roots near the curb and would probably not experience much stress.

Photograph 6 shows trees 8 and 9 in front of 292 Gibraltar Drive. Tree 8 has a number of small roots within 5 feet of the curb but no large roots. Tree 9, though smaller than tree 8, has one root about 1 inch in diameter that would be cut if a sidewalk were constructed. The root zone near tree 9 has already been somewhat impacted by the presence of the nearby street light.

Photograph 7 shows tree 10, which is near the sign for 292 Gibraltar Drive. Though this tree has a number of small roots within 5 feet of the curb, no large roots were found.

Tree 11, shown in Photograph 8, also was only found to have only small roots within 5 feet of the curb. This tree has a circling, girdling root system (Photograph 9). Circling roots represent a major defect in the root system of a tree. They are usually the result of a root-bound condition in a nursery container, which causes roots to grow in a circle around the outside of the root ball. Circling roots can stunt the tree because they restrict trunk diameter growth. They can also create tree stability problems because of lack of anchoring by primary roots. At present this tree appears healthy, probably because it has developed a secondary system of small adventitious root to replace the primary roots. However, it should be evaluated for tree hazard in the future and may be a candidate for removal if the root system is considered seriously compromised.

From these observations it can be concluded that most of the Canary Island pines will tolerate construction of a sidewalk in front of 256 and 292 Gibraltar Drive. Canary Island pines are more tolerant of soil disturbance near the trunk than other pine trees, such as Monterey pines, because they tend to have a deep root system. In general, most trees will tolerate cutting of roots less than 1 inch in diameter.

However, significant stress can be expected for a few of the pine trees if roots are cut, including trees 1, 3 and 5. Tree 3 should be considered for removal. The other trees should be evaluated for stress after construction. Tree 9 may tolerate cutting of the large root near the curb but should be evaluated for resulting stress. Consideration should be given to removal and replacement of tree 11 because of its poor root conformation.

The redwood trees in front of 256 and 292, because they are small, are assumed to still have a limited root system. These trees will not be significantly affected by construction of a sidewalk and should be able to adapt to changes made to the root zone.

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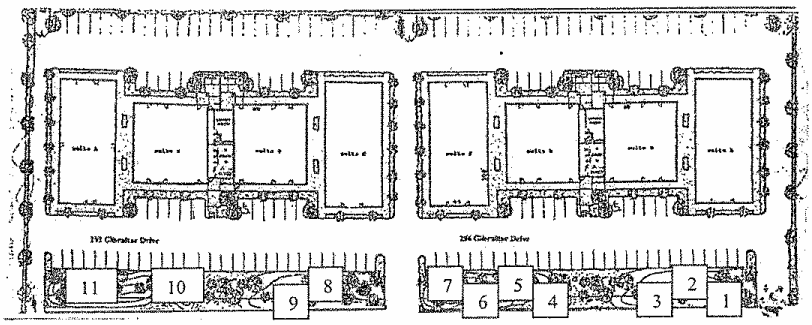
256 & 292 GIBRALTER DRIVE
SUNNYVALE, CA 94087



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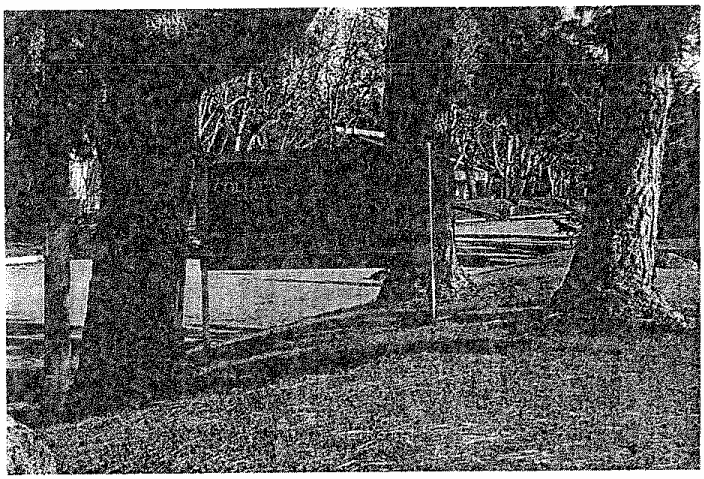
Photograph 1. Canary Island pine trees 1, 2, 3 and 4 in front of 256 Gibraltar Drive.



Photograph 2. Large root of tree 1 that would be impacted by sidewalk construction.

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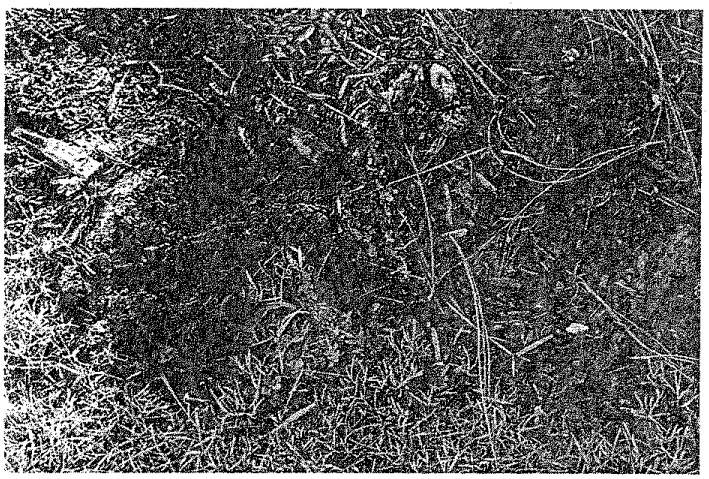
Photograph 3. Large tree roots of tree 3.



Photograph 4. Trees 4, 5, 6 and 7 in front of 256 Gibraltar Drive.

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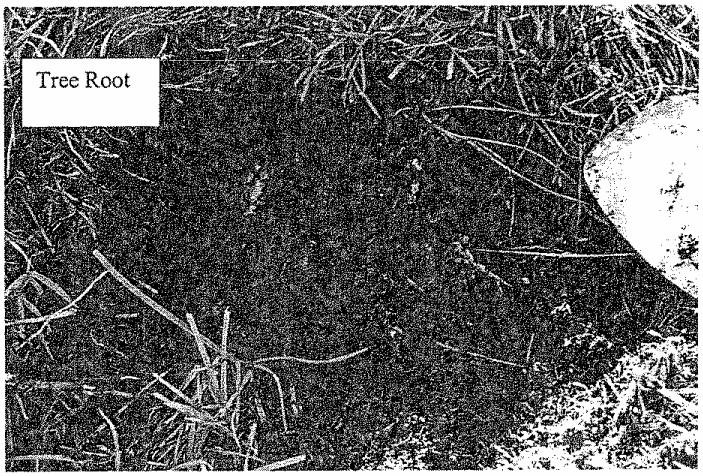
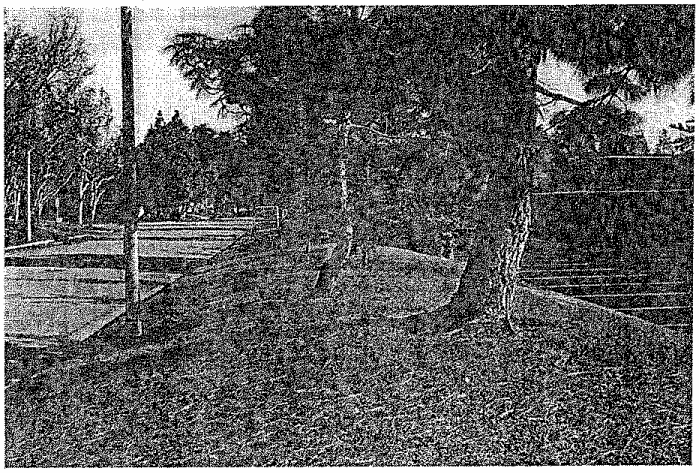
Photograph 5. Large root of tree 5 that would be impacted by sidewalk construction



Photograph 6. Trees 8 and 9 in front of 292 Gibraltar Drive.



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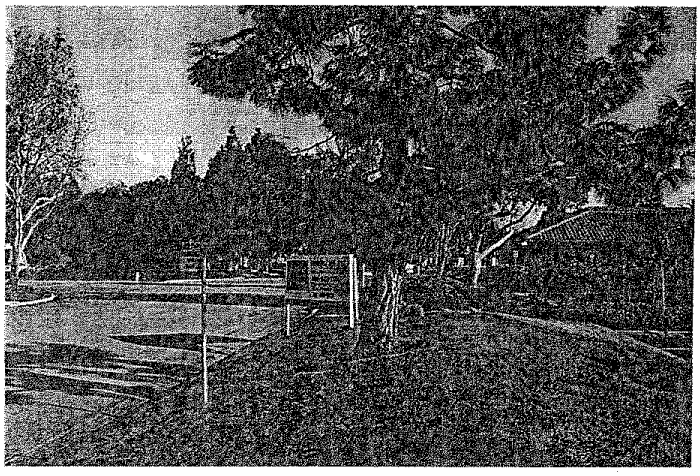
Photograph 7. Tree 10 in front of 292 Gibraltar Drive.

Photograph 8. Tree 11 in front of 292 Gibraltar Drive.



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Photograph 9. Base of trunk of tree 11 showing circling, girdling roots.